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The Study on Movements and Activity Patterns of Whitespotted Conger Using Biotelemetry at Tsunami-stricken Brackish Lagoon, Matsukawa-ura, Fukushima

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Abstract

Whitespotted conger *Conger myriaster*, widely distributed in northeast Asian coastal waters, is an important fishery species in Tohoku region of northeastern Japan since its annual fishery catches reached to 750 to 1550 tons per year. Matsukawa-ura, a brackish lagoon in Fukushima Prefecture of Tohoku, has been reported to play important roles on growing and foraging in juvenile and young stages of this species. After the Great East Japan Earthquake and tsunami on March 2011, more number of congers larger than the previously reported body sizes has been caught from this lagoon. It might be caused by suspensions of fishery and environmental changes, but movements and activity patterns of this species in this lagoon are still unknown. The aim of our study was to elucidate whitespotted congers' migrations between the lagoon and outer sea, distributions, movement patterns, and diel activity patterns in Matsukawa-ura using biotelemetry. Twenty-four and one ultrasonic receivers (VR2W; Vemco Ltd., Canada) were respectively moored at the entire field of Matsukawa-ura and at the entrance of lagoon from outer sea. Forty-nine fish (total length: 494-797 mm) captured by fishing baskets were released with implanted ultrasonic transmitters (V13AP and V13-1H; Vemco Ltd.) in September (n = 15) and November (n = 34) of 2013. The number of fish detected in Matsukawa-ura gradually decreased during a five-month monitoring period, and fourteen percent of fish were still detected in Matsukawa-ura on the day when the latest data were downloaded (20 January, 2014). Also, six percent of fish were detected again in the Lagoon after disappearance at outer sea for several days to several weeks. It is expected that emigration and immigration movements of whitespotted conger were triggered by unsuitable water temperature (>23°C, <10°C) condition of the lagoon. Most of fish tended to show distributions around the northern part of the lagoon near the entrance channel since seventy-three percent of signal detections were recorded to northern receivers, but ten percent of fish were detected continuously at the southern area for weeks. According to acceleration data, congers showed more active during night than daytime. Also, swimming depths of each fish were more distributed during night comparing to its bottom sticking trends during daytime. Thirty-four percent of fish had horizontal movements during night (< 2 km) but stayed at its own particular places during daytime. Our results showed that Matsukawa-ura can serve as an important nursery habitat for whitespotted conger after the earthquake and tsunami disaster.

Keywords: Whitespotted Conger, *Conger myriaster*, Biotelemetry, Matsukawa-ura lagoon, Ultrasonic acceleration transmitter